Hardware Reference Manual

MEGAPORT

Serial I/O Boards

including

MEGAPORT:

MEGAPORT 12CS
MEGAPORT 24CS
MEGAPORT 12FM
MEGAPORT 12LD
MEGAPORT 24LD
MEGAPORT 12LD+12CS

MEGAPORT/2:

MEGAPORT/2 12CS MEGAPORT/2 24CS MEGAPORT/2 12FM MEGAPORT/2 12LD MEGAPORT/2 24LD MEGAPORT/2 12LD+12CS

MEGAPORT/RS:

MEGAPORT/RS 12CS MEGAPORT/RS 24CS MEGAPORT/RS 12LD MEGAPORT/RS 24LD MEGAPORT/RS 12LD+12CS



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NOTE: This unit was tested with shielded cables on the peripheral devices. Shielded cables must be used with the unit to insure compliance.

NOTE: The manufacturer is not responsible for any radio or TV interference caused by unauthorized modifications to this equipment. Such modifications could void the user's authority to operate the equipment.

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Hardware Reference Manual

MEGAPORT/2 MEGAPORT/RS

Serial I/O Boards



CHAPTER 1 INTRODUCTION

The Equinox MEGAPORT, MEGAPORT/2 and MEGAPORT/RS family of multi-user boards provides the highest performance serial I/O solution for UNIX, XENIX and AIX applications in ISA, EISA and Micro Channel bus systems.

Except for the computer bus interface and an additional step in the hardware configuration process, MEGAPORT/2 and MEGAPORT/RS products are identical to their MEGAPORT counterparts. In this manual the term MEGAPORT refers to all nineteen products:

ISA and EISA Bus Products:

- MEGAPORT 8CS: an 8-port board with standard RS-232 interface and modem control signals on all ports. This board is not addressed in this manual; refer to the MEGAPORT 8CS Hardware Reference Manual, Equinox part number 560044.
- **MEGAPORT 12CS:** a 12-port board with standard RS-232 interface and modem control signals on all ports.
- **MEGAPORT 24CS:** a 24-port board with standard RS-232 interface and modem control signals on all ports.
- **MEGAPORT 12FM:** a 12-port board with standard RS-232 interface and full modem control signals on all ports.
- MEGAPORT 12LD: a 12-port board with on-board line drivers for long distance applications which do not require modem control signals.
- MEGAPORT 24LD: a 24-port board with on-board line drivers for long distance applications which do not require modem control signals.
- MEGAPORT 12LD+12CS: a 24-port board. The first 12 ports use on-board line drivers for long distance applications which do not require modem control signals. The second twelve ports provide the standard RS-232 interface with modem control signals on all ports.

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Micro Channel Products for IBM PS/2 and NCR 3000 Systems:

- MEGAPORT/2 12CS: a 12-port board with standard RS-232 interface and modem control signals on all ports.
- MEGAPORT/2 24CS: a 24-port board with standard RS-232 interface and modem control signals on all ports.
- MEGAPORT/2 12FM: a 12-port board with standard RS-232 interface and full modem control signals on all ports.
- MEGAPORT/2 12LD: a 12-port board with on-board line drivers for long distance applications which do not require modem control signals.
- MEGAPORT/2 24LD: a 24-port board with on-board line drivers for long distance applications which do not require modem control signals.
- MEGAPORT/2 12LD+12CS: a 24-port board. The first 12 ports use on-board line drivers for long distance applications which do not require modem control signals. The second twelve ports provide the standard RS-232 interface with modem control signals on all ports.

Micro Channel Products for IBM RISC System/6000:

- **MEGAPORT/RS 12CS:** a 12-port board with standard RS-232 interface and modem control signals on all ports.
- **MEGAPORT/RS 24CS:** a 24-port board with standard RS-232 interface and modem control signals on all ports.
- **MEGAPORT/RS 12LD:** a 12-port board with on-board line drivers for long distance applications which do not require modem control signals.
- MEGAPORT/RS 24LD: a 24-port board with on-board line drivers for long distance applications which do not require modem control signals.
- MEGAPORT/RS 12LD+12CS: a 24-port board. The first 12 ports use on-board line drivers for long distance applications which do not require modem control signals. The second twelve ports provide the standard RS-232 interface with modem control signals on all ports.

All of these boards differ only in the bus interface, the number of ports provided on each and in the methods used to connect the boards to terminals, printers and modems.

CS

MEGAPORT models with CS in their name provide the traditional RS-232 interface, including two modem control signals, which may be used for either DTR/DCD modem supervision or RTS/CTS hardware flow control. The MEGAPORT 12CS and 24CS models come with a cable terminating in a 50-pin telco connector which can be attached to a variety of splitters and distribution panels for device connection. The MEGAPORT 8CS provides this interface at 8 modular jacks located directly on the board's mounting bracket.

FΜ

MEGAPORT models designated FM provide RS-232 interface signals with full modem control and may be used for modem, terminal and/or printer hardware flow control. The MEGAPORT 12FM models come with a 12-port RJ-45 (ten pin connector jacks) splitter for device connection and a 100-conductor cable for connecting the board to the splitter.

LD

MEGAPORT models with LD in their name include a custom interface which is compatible with RS-232, RS-422 and RS-423 devices. These boards are designed for applications requiring long cable runs, beyond the limits of the standard RS-232 interface and operate with standard RS-232 devices at 38.4 Kbps to distances of up to 1000 feet.

This distance may be further extended to 3000 feet using an Equinox LDA-232 line driver at the terminal end. LD boards do not provide modem control signals and are designed for use with terminals, printers and other non-modem devices.

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Applicability

This manual is applicable to the following Equinox products:

- MEGAPORT 12CS
- MEGAPORT 24CS
- MEGAPORT 12FM
- MEGAPORT 12LD
- MEGAPORT 24LD
- MEGAPORT 12LD+12CS
- MEGAPORT/2
- MEGAPORT/2 24CS
- MEGAPORT/2 12FM
- MEGAPORT/2 12LD
- MEGAPORT/2 24LD
- MEGAPORT/2 12LD+12CS
- MEGAPORT/RS 12CS
- MEGAPORT/RS 24CS
- MEGAPORT/RS 12LD
- MEGAPORT/RS 24LD
- MEGAPORT/RS 12LD+12CS

About This Manual

This manual is a complete technical reference to the hardware installation and operation of all members of the MEGAPORT family of high-performance multi-user boards, with the exception of the MEGAPORT 8CS. It should be used in conjunction with one of the MEGAPORT device drivers discussed below.

There is a considerable similarity in the installation and operation of all MEGAPORT products. Throughout this manual, the term MEGAPORT is used and applies to all members of the family. Specific product names, such as MEGAPORT 12CS and MEGAPORT/2 24LD are used to refer to issues which are specific to that board.

This manual is organized as follows:

Chapter 1 - Introduction

Introduces the members of the MEGAPORT family and lists the hardware and software provided with each MEGAPORT board.

Chapter 2 - Installing MEGAPORT Hardware

Covers the system installation of MEGAPORT, MEGAPORT/2 and MEGAPORT/RS boards.

Chapter 3 - Connecting Devices to CS and FM Ports

Chapter 3 describes the procedures used to connect devices to MEGAPORT CS boards (12CS, 24CS and the second 12 ports on the 12LD+12CS) and MEGAPORT 12FM boards. Included are wiring diagrams for assistance in building adaptors and cables.

Chapter 4 - Connecting Devices to LD Ports

This chapter describes the procedures used to connect devices to MEGAPORT LD boards (12LD, 24LD and the first 12 ports on the 12LD+12CS). Included are wiring diagrams for assistance in building adaptors and cables.

Equipment Checklist

A MEGAPORT package contains:

- MEGAPORT* Board
 Installs in any 80286-, 80386- or 80486-based computer.
- 1" Interconnect cable (MEGAPORT only)
 Used to connect multiple MEGAPORT boards together.
- EISA Jumper (MEGAPORT only)
 For EISA bus computers.
- UNIX/XENIX Device Driver Kit

Provides the software and manual required for installing MEGAPORT boards in systems running the UNIX System V 3.2/386 operating system, the 286 or 386 SCO XENIX operating system and compatible variants.

- UNIX STREAMS Device Driver Kit
 Provides the software and manual required for installing MEGAPORT boards in systems running the UNIX System V Release 4 STREAMS operating system and compatible variants.
- AIX-2 Device Driver Kit (MEGAPORT/2 only)
 Provides the software and manual required for installing MEGAPORT/2 boards in systems running IBM AIX Version 2.
- AIX-3 Device Driver Kit (MEGAPORT/RS only)
 Provides the software and manual required for installing MEGAPORT/RS boards in systems running IBM AIX Version 3.

Introduction

Different device driver kits with different part numbers are provided with MEGAPORT, MEGAPORT/2 and MEGAPORT/RS (slight differences in the installation process necessitate this for ease of installation). With MEGAPORT/2 boards a PS/2 Option Diskette is also included.

*MEGAPORT 12FM and MEGAPORT/2 12FM products include a 12-port RJ-45 Splitter and a 100-conductor interconnecting cable.

Software Support

MEGAPORT products are supported under various operating systems by different software device drivers supplied by Equinox and other vendors. At the time of this writing, the following device driver kits (including diskettes and manuals) are available for MEGAPORT:

- UNIX System V 3.2/386 operating system, SCO XENIX 286 or 386 operating system and compatible variants. Included with MEGAPORT and MEGAPORT/2 boards. For MEGAPORT: Equinox part number 650078 (both 5.25" and 3.5" diskettes).
 For MEGAPORT/2: Equinox part number 650053 (3.5" diskettes).
- UNIX System V Release 4 STREAMS operating system and compatible variants. Included with MEGAPORT and MEGAPORT/2 boards. For MEGAPORT: Equinox part number 650074 (both 5.25" and 3.5" diskettes). For MEGAPORT/2: Equinox part number 650089 (3.5" diskettes).
- IBM AIX Version 2.x operating system. Included with MEGAPORT/2 boards. Equinox part number 650079 (3.5" diskettes).
- IBM AIX Version 3.x operating system. Included with MEGAPORT/RS boards. Equinox part number 650081 (3.5" diskettes).
- QNX and THEOS operating systems. Available in North America from Florida Datamation, 1-800-642-5938. Available elsewhere from Equinox.

For other supported operating systems not listed, consult your authorized Equinox sales representative.

References

In addition to this manual and the appropriate *Software Reference Manual* as provided in a device driver kit, readers may be interested in these publications:

For combined installation of MEGAPORT and MEGAPLEX:

MEGAPLEX Hardware Reference Manual, part number 560050.

For LD board installation:

Technical Note #1, *MEGAPORT LD: Exploring Long Distance Connections to Terminals & Printers.* Part number *302024*. A copy is shipped with all LD boards.

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Chapter 2 Installing MEGAPORT Boards

This chapter describes how to install MEGAPORT, MEGAPORT/2 and MEGAPORT/RS boards into a computer system. The following topics are covered:

- The MEGAPORT Board
- EISA Installations
- Intermixing MEGAPLEX and MEGAPORT Boards
- Installing a Single MEGAPORT Board
- Installing Multiple MEGAPORT Boards
- PS/2 Type Hardware Configuration
- RS/6000 Hardware Configuration
- Installing the Round Cable

The MEGAPORT Board

Figure 2-1 is an illustration of the MEGAPORT boards. No hardware configuration is required on the board. However, make careful note of the J2 and J3 connector locations. J2 is the input connector and J3 is the output connector. These connectors are used when more than one MEGAPORT board is installed. Interconnections between boards are not required when installing multiple MEGAPORT/2 or MEGAPORT/RS boards.

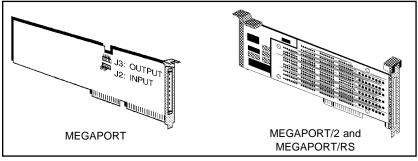


Figure 2-1. MEGAPORT, MEGAPORT/2 and MEGAPORT/RS boards

EISA Installations

When installing a MEGAPORT board in an EISA system, a jumper must be installed to permit the configuration scheme to work properly. This jumper causes the MEGAPORT board to occupy I/O addresses 0x340 and 0x341. These addresses should not be used by another device.

Install the jumper across the left top-most two pins denoted by "PA0" on the printed circuit board (see Figure 2-2). This figure shows only PA0 installed to select addresses 0x340 and 0x341. Install the jumper in the same location on all MEGAPORT boards.

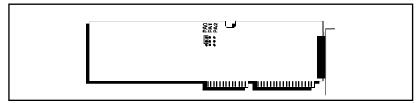


Figure 2-2. Installing the EISA configuration jumper

Intermixing MEGAPLEX & MEGAPORT

MEGAPORT boards may be intermixed with other Equinox products including the MEGAPORT 8CS and MEGAPLEX. MEGAPORT/2 boards may be intermixed with MEGAPLEX/2. MEGAPORT/RS boards may be intermixed with MEGAPLEX/RS.

The MEGAPORT 8CS is in all respects equivalent to a 24CS board except it has RJ-11 modular jacks on the mounting bracket. It installs in a system the same as a MEGAPORT board except for device wiring. Refer to the *MEGAPORT 8CS Hardware Reference Manual* (part number *560044*) for more information.

The MEGAPLEX serial I/O subsystem is functionally equivalent to multiple MEGAPORT boards and may also be intermixed in a computer. There are some minor considerations in the physical installation. Refer to the *MEGAPLEX Hardware Reference Manual (*part number *560050)* for more information.

Installing a Single MEGAPORT Board

The first MEGAPORT board installed should be placed in the first available computer slot. On a desktop chassis IBM AT, this is the first empty slot closest to the power supply. In a tower chassis, it is the topmost slot. By installing the MEGAPORT board in the first empty slot (closest to the power supply), the next MEGAPORT board installed is close enough to connect up with the 1" interconnect cable.

MEGAPORT/2 and MEGAPORT/RS boards do not require the interconnect cable, so any slot may be used. The first board is referred to as MEGAPORT Board #1.

The following steps describe how to install the MEGAPORT board in a personal computer:

- Set the system unit power switch to OFF.
- Disconnect the power cord and all other cables from the back of the system unit.
- Locate and remove the cover mounting screws and slide the cover off the unit (or lift the cover up depending upon the type of chassis).
- Locate the first free expansion slot closest to the power supply (see Figure 2-3). For MEGAPORT/2 and MEGAPORT/RS, use any slot (see Figure 2-4). Remove the expansion slot cover by first removing the screw which holds the cover in place and then lifting off the slot cover completely.
- Insert the board firmly into the computer's expansion slot.
 Make sure the gold striped end of the board is seated properly in the expansion slot groove and the bracket of the board is in the groove which previously held the slot cover.

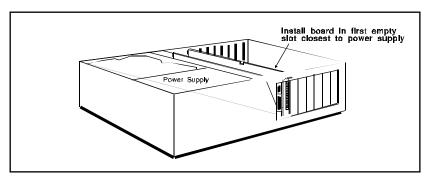


Figure 2-3. Installing MEGAPORT board in desktop chassis

- After making sure that the top of the board's bracket is aligned with the hole on the top of the expansion slot, replace the screw which previously held the expansion slot cover. Tighten the screw so it holds the board firmly in place.
- If more than one MEGAPORT board is to be installed, refer to paragraph heading *Installing Multiple MEGAPORT* Boards.
- Leave the cover of the computer off (or open) until it is verified that the board is working. If a loose connection or a bad slot is suspect, it may be necessary to change the board's slot location.

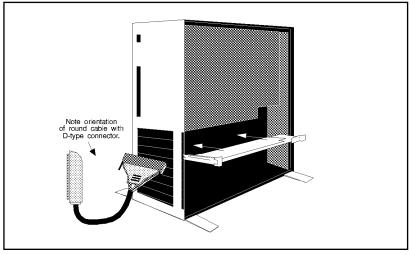


Figure 2-4. Installing MEGAPORT in a tower chassis

Installing Multiple MEGAPORT Boards

MEGAPORT boards may be installed and intermixed with other Equinox products (such as, MEGAPORT 8CS and MEGAPLEX boards) in a computer system. Likewise, MEGAPORT/2 boards may be intermixed with MEGAPLEX/2 and MEGAPORT/RS boards may be intermixed with MEGAPLEX/RS in their respective computer system chassis.

For multiple MEGAPORT/2 and MEGAPORT/RS, simply install the additional boards in empty slots in the computer. The interconnect cable is not required for Micro Channel MEGAPORT products.

Keep the following in mind when installing additional MEGAPORT boards:

- MEGAPORT board #1 is usually the board which is installed in the slot closest to the power supply. When facing the front of the computer, subsequent MEGAPORT boards are installed to the left of previously installed MEGAPORT boards (next to the non-component side of the installed board).
- Refer to Figure 2-1 to locate the J2 and J3 connectors.
- Be sure MEGAPORT board #1 is installed according to the directions outlined in the previous paragraphs.

To install additional MEGAPORT boards, perform the following steps (refer to Figure 2-5):

- Locate the J2 connector on the board to be installed. This is located just below the J3 connector. Plug the short interconnect cable into the J2 connector.
- Locate the free expansion slot located to the left (facing the front of a desktop chassis computer) or below (for tower chassis) of the previously installed MEGAPORT board.
 Remove the expansion slot cover by first removing the screw which holds the cover in place. Then lift off the slot cover completely.
- Insert the board firmly in the computer's expansion slot. Be sure the gold striped end of the board is seated properly in the slot's groove and the bracket of the board is in the groove which previously held the slot cover.

- 4. After making sure that the top of the board's bracket is aligned with the hole on the top of the expansion slot, replace the screw which previously held the expansion slot cover. Tighten the screw firmly.
- 5. Connect the interconnect cable on the newly installed board to the J3 connector on the previously installed board located to right of the new board.
- 6. If more than one additional MEGAPORT board is being installed, repeat steps 1 through 5 for each board.

Note: If the computer has trouble finding the second MEGAPORT board, suspect a faulty connection with the MEGAPORT 1" interconnect cable. Remove the interconnect cable and reinstall it making sure none of the pins are bent and all the pins are enclosed by the interconnect cable.

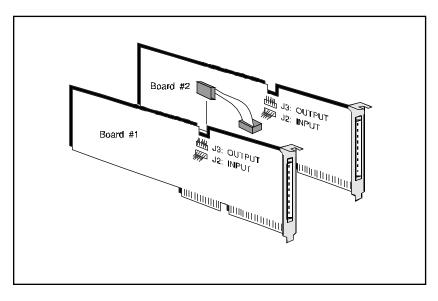


Figure 2-5. Interconnecting multiple MEGAPORT boards

PS/2-Type Hardware Configuration

MEGAPORT/2 only.

This section applies to the IBM PS/2, the NCR 3000 Series and other similar Micro Channel Architecture computers. The process described is essentially the same for each, although some terminology may vary.

After installing the MEGAPORT/2 board, the computer must be configured. The first time the machine is turned on with the MEGAPORT/2 installed, an error code of 165 appears on the screen and 2 beeps are sounded after the RAM is counted. This error message indicates that the configuration has been changed and the machine must be reconfigured to recognize the MEGAPORT/2.

Micro Channel machines require an Adapter Description File (ADF) to automatically configure each peripheral device (adapter) installed. The system identifies the adaptor by requesting a Programmable Option Select (POS) ID from adapters installed in the computer. The POS ID for the MEGAPORT/2 is 6384. The corresponding ADF file (@6384.ADF) for the MEGAPORT/2 containing the configuration information for the board is provided on the MEGAPORT/2 Option Diskette. This file must be copied to a backup of the Reference Diskette supplied with the computer. The steps for coping the file to the Reference Diskette backup disk are presented below:

1. After the 165 error message, the machine appears to hang. Place the Reference Diskette in drive A: and press F1. The screen clears and the banner screen appears. Press Enter to continue. The following message displays:

Use Automatic Configuration (Y/N)? N

Answer no to the automatic configuration question. The main menu displays:

Main Menu

- 1. Learn about the computer.
- 2. Backup the Reference Diskette.
- 3. Set Configuration.
- 4. Set features.
- 5. Copy an option diskette.
- 6. Test the computer.

Because the MEGAPORT/2 installation modifies the Reference Diskette, a backup of the diskette should be made. A blank 1.44 MB diskette that is not write protected is required. Select option #2 and follow the instructions. This step may be skipped if a backup copy is currently being used.

After completing the backup, store the original Reference Diskette in a safe place. Continue using the backup.

3. Reboot the system using the backup reference diskette and select option 5, Copy an option diskette, from the main menu.

When asked, insert the new Option Diskette into drive A: and the @6384.ADF file is copied into RAM. Then when asked, insert the Reference Diskette into drive A and the @6384.ADF file is appended to the Reference Diskette.

4. After copy is finished and the system returns to the main menu, the configuration can be set. Select option 3, Set configuration, from the main menu.

The set configuration menu appears. From this menu, select option 5, Run automatic configuration.

Set Configuration

- 1. View configuration.
- 2. Change configuration.
- 3. Backup configuration.
- 4. Restore configuration.
- 5. Run automatic configuration

- 5. After running the automatic configuration, the system CMOS now contains the configuration of all the adapters including the MEGAPORT/2. At this point, backup the new configuration by selecting option 3, Backup configuration, from the set configuration menu.
- 6. The new configuration is copied onto the Backup Reference diskette. After the backup is complete, remove the Backup Reference diskette and store it and the original Reference Disk in a safe place. Exit the POS configuration utilities and reboot the system from the hard disk. The system should boot normally and not display the 165 error message. The system is now ready to have the device driver installed as described in the appropriate Software Reference Manual.

RS/6000 Hardware Configuration

MEGAPORT/RS only.

After installing MEGAPORT/RS board, the board must be configured using the IBM SMIT facility. Refer to the *AIX-3 Software Reference Manual, Equinox part number 560049.*

Installing the Round Cable

Each MEGAPORT package includes a round cable which plugs into the 100-pin female connector on the MEGAPORT board. MEGAPORT 12-port boards use a single round cable providing one standard telco 50-pin telco connector. MEGAPORT 24-port boards use a double round cable providing two telco connectors.

Equinox wiring accessories convert the telco connectors to DB-25 or RJ-11 modular jacks for distribution of ports to external devices such as terminals, modems and printers. The pinouts of the telco connector vary based on whether the board is a CS, FM or LD type. Telco pinouts and wiring diagrams for the various CS and LD type accessories are found in Chapters 3 and 4, *Connecting Devices To CS & FM Ports* and *Connecting Devices To LD Ports*, respectively.

NOTE: The FM board connector pinouts are proprietary to Equinox and are not furnished. However, the RS-232 signals for the RJ-45 (10-pin) modular splitter (device connection) pinouts are identified in Chapter 3.

Follow these steps to connect the cable to the MEGAPORT board:

- Locate the 100-pin female connector on the back of the MEGAPORT board.
- Notice that the 100-pin cable connector is keyed such that it can only attach to the board in one orientation. With the cable properly oriented, insert the 100-pin male cable connector into the female MEGAPORT board connector and press firmly. Tighten the screws to hold the cable securely to the board.

Equinox 25-pair extension cables may be used to extend the distance from the cable attached to the MEGAPORT board to the cabling accessories. These cables plug into distribution panels, punch blocks, fan-out cables and modular splitters. Extension cables in various lengths are available from Equinox.

Chapter 3 Connecting Devices To CS & FM Ports

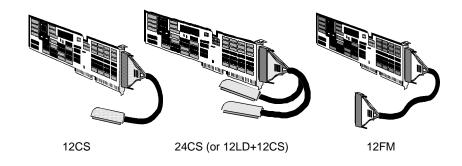
This chapter applies equally to MEGAPORT, MEGAPORT/2 and MEGAPORT/RS and explains the cabling options which may be used to connect devices to:

- the MEGAPORT 12CS board:
- the MEGAPORT 24CS board:
- the MEGAPORT 12FM board: and
- the second group of twelve ports (i.e. ports numbered 13 through 24) on the MEGAPORT 12LD+12CS board. (The second group of twelve ports on the MEGAPORT 12LD+12CS board are identical to the corresponding ports on the 24CS board.)

These ports are all of the CS or FM type and provide a standard RS-232 interface with modem or full modem control signals.

NOTE: The information in this chapter should not be used to connect devices to MEGAPORT 12LD, MEGAPORT 24LD boards or to connect devices to the first group of twelve ports on the MEGAPORT 12LD+12CS boards. For information on connecting to these ports please refer to Chapter 4, *Connecting to LD Ports* or to *Equinox Technical Note #1, MEGAPORT LD, part number 302024.*

To assist in wiring the MEGAPORT board, Equinox sells a complete set of cabling accessories. See an *Equinox Ordering Guide* for more information.



CS Port Signals

Signal Names

The names of signals on the telco connectors of the MEGAPORT ports indicate the direction of the signals. They are either *inbound* (received by MEGAPORT) or *outbound* (transmitted from MEGAPORT).

Data Signals

The following names are used for data signals:

DATA IN indicates data received by the MEGAPORT board from the attached device (inbound).

DATA OUT indicates data transmitted from the MEGA-PORT board to the attached device (outbound).

EIA Control Signals

The following names are used for modem control signals:

CNTL IN indicates the control signal received by the MEGAPORT board (inbound).

CNTL OUT indicates the control signal transmitted from the MEGAPORT board (outbound).

The conversion to RS-232 from the MEGAPORT telco pinouts and signal names (DATA IN, DATA OUT, CNTL IN and CNTL OUT) is accomplished by using Equinox modular adaptors and/or RS-232 distribution panels. The information below should assist in selecting the correct modular adaptor for the particular application.

Conversion to RS-232 Signal Names

The conversion to RS-232 from the CS telco connector pinouts and MEGAPORT signal names (DATA IN, DATA OUT, CNTL IN, and CNTL OUT) is accomplished with one of the Equinox cabling accessories.

These accessories and wiring techniques are discussed under the paragraph heading *Wiring to Terminal Devices*.

Telco Connector Pinouts

This part of Chapter 3 lists the cable pinouts of the CS ports. The physical ports are mapped by the device driver into UNIX/XENIX tty device names.

MEGAPORT 12CS Board Telco Connector Pinouts

Figure 3-1 shows the wiring of the telco connector on the MEGA-PORT 12CS board. A single cable provides all the signals required for supporting 12 ports.

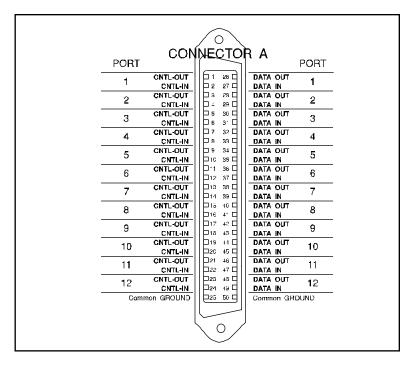


Figure 3-1. MEGAPORT 12CS telco connector pinouts

MEGAPORT 24CS Board Telco Connector Pinouts

The wiring of the telco connectors on the MEGAPORT 24CS board is shown in Figure 3-2. Connector A provides CS ports 1-12 and is identical to the MEGAPORT 12CS connector. Connector B provides CS ports 13-24.

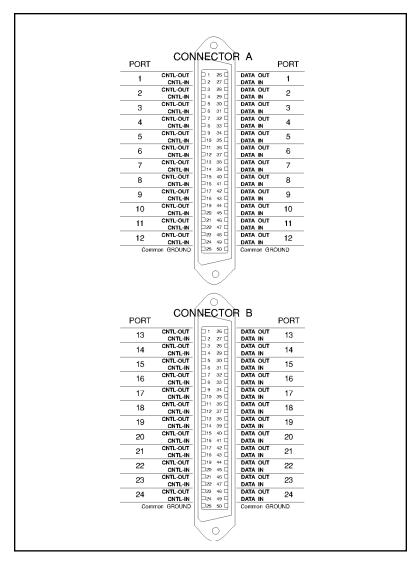


Figure 3-2. MEGAPORT 24CS telco connector pinouts

MEGAPORT 12LD+12CS Board Telco Connector Pinouts

The wiring of the telco connectors of the MEGAPORT 12LD+12CS board is shown on Figure 3-3. Connector A provides LD ports 1-12 and is identical to the MEGAPORT 12LD connector (see Chapter 4). Connector B provides CS ports 13-24 and is identical to Connector B on the MEGAPORT 24CS.

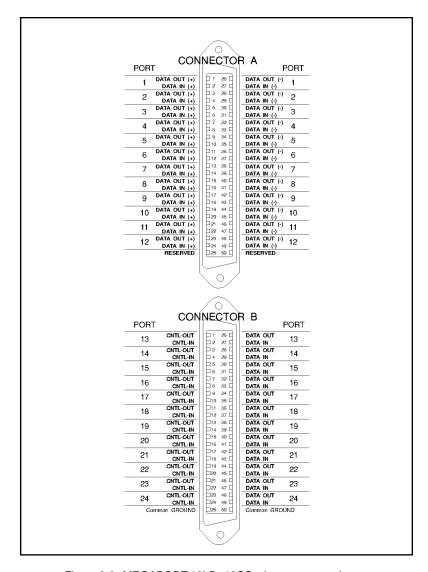


Figure 3-3. MEGAPORT 12LD+12CS telco connector pinouts

FM Port Signals

Signal Names

The FM port signals (RS-232 compatible) between the 12 FM Splitter and the connected devices are identified in Figure 3-4.

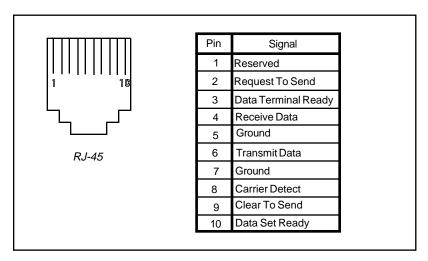


Figure 3-4. 12 FM Splitter RJ-45 jack pinouts.

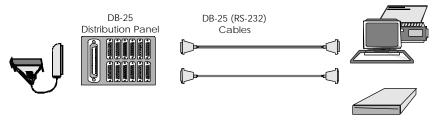
All twelve RJ-45 jacks on the 12 FM Splitter are identical in pinout.

Wiring to Terminal Devices

Various accessories may be used to connect devices to MEGAPORT CS or FM ports, using the two primary wiring methods: DB-25 or modular wiring. They include:

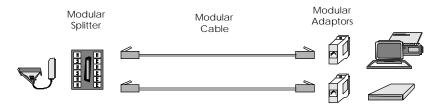
For DB-25 Wiring:

 DB-25 distribution panels are used to convert 50-pin connectors to DB-25 RS-232 connectors.

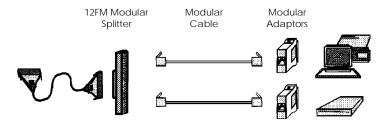


For Modular Wiring:

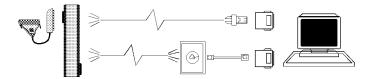
- Modular splitters are used with modular adaptors and modular cables to connect devices to the board.
- Modular adaptors and cables are used for attaching devices to the selected cabling option.



 12FM modular splitters are used with modular adaptors and modular cables to connect devices to the MEGAPORT 12FM boards.



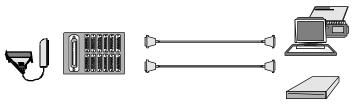
• **Punch blocks** may also be used with modular wall outlets and other modular accessories.



DB-25 Wiring

DB-25 Distribution Panels

Distribution panels convert 50-pin connectors to twelve DB-25 RS-232 connectors. One distribution panel or fan-out cable is required for 12 devices. Two are required for 24 ports.



The following distribution panels are available from Equinox:

Part No.	DB-25 Connector	Connect To
990117	12 DCE female	terminals and DTE devices
990121	12 DTE male	modems
990122	12 DTE female	male DCE devices

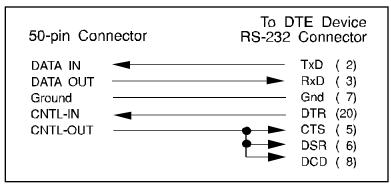


Figure 3-5. Internal wiring for DCE distribution panels

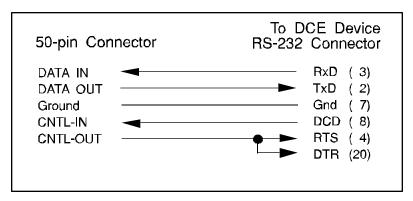


Figure 3-6. Internal wiring for DTE distribution panels

Modular Wiring

CS Modular Splitter

Modular splitters are used with modular adaptors and modular cable. Modular splitters convert the 50-pin connector to a set of 12 modular jacks. Figure 3-7 illustrates devices connected to the MEGAPORT using the modular splitter.

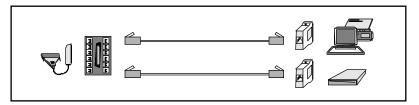


Figure 3-7. CS Modular splitter

- The CS modular splitter (Equinox part number 210016) converts the signals on the 50-pin connector to 12 RJ-11 modular jacks. (Two modular splitters are required to connect 24 devices.) This splitter should be used to connect to CS ports only. An LD version of the modular splitter (Equinox part number 210117) is available for connecting devices to LD ports.
- Either 4 or 6-wire modular cable may be used to attach devices to the splitter. The outer two wires which support control signals are omitted when using 4-wire cables. Standard modular cables used for telephones are always reversing (e.g. pin 1 is connected to pin 4, etc.) and are typically 4-wire. If a user supplied modular cable is used, make sure the cable is reversing (see paragraph heading Modular Cables).
- Modular adaptors convert modular jacks at the end of modular cables to DB-25 RS-232 connectors. One adaptor for each device to be connected is required.

The CS modular splitter is wired as shown in Figure 3-8. Signal names shown refer to those present on the CS telco connector.

Note that pins 49 and 50 of the 50-pin telco connector are connected together and are used for signal ground.

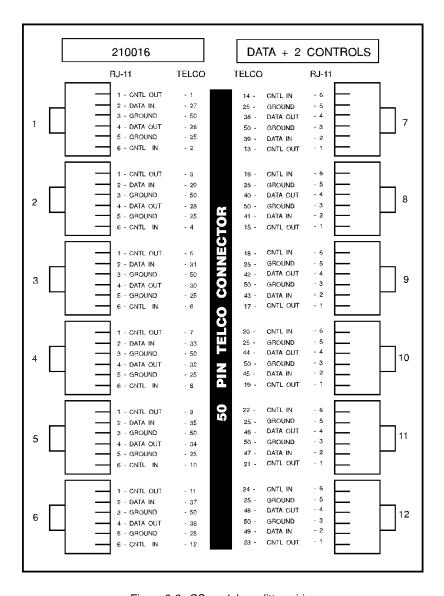


Figure 3-8. CS modular splitter wiring

FM Modular Splitter

FM modular splitters are used with modular adaptors and modular cables. This splitter converts the 100-pin MEGAPORT 12FM board connector to a set of 12 RJ-45 modular jacks. Figure 3-9 illustrates devices connected to the MEGAPORT using the FM modular splitter.

- The FM modular splitter (Equinox part number 990173)
 converts the signals on the 100-pin connector to 12 RJ-45
 modular jacks. This modular splitter is used to connect
 the MEGAPORT board to ports requiring full modem
 control
- 10-wire modular cable must be used to attach devices to the splitter.

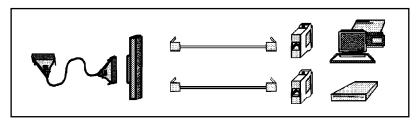


Figure 3-9. FM Modular splitter

Modular Cables

RJ-11 modular cable is the flat cable used for wiring telephones inside of buildings. The cable is terminated at each end with an RJ-11 modular plug (connector) which is inserted into the modular jack of an appropriate wiring module. Standard modular cables available from Equinox or wiring distributors are reversing; that is the pins are reversed on each end (so that pin 1 on one end is connected to pin 6 on the opposite end, etc.). Figure 3-10 illustrates the signals passed through modular cables when connected to a CS port using the Equinox part number 210016 CS modular splitter.

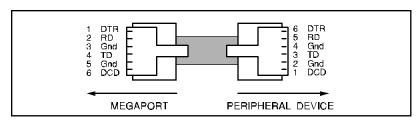


Figure 3-10. Modular cable signals

CS Modular Adaptors

CS modular adaptors (see Figures 3-11) convert modular jacks to DB-25 or DB-9 (RS-232) connectors. The following list describes the modular adaptors available from Equinox. This list may be used to determine the correct modular wiring accessories required for system installation.

Part No.	Connector	Connect To
210036	DB-25 DCE male	terminals or ports (female DTE)
210037	DB-25 DCE female	terminals, ports, ISA PC, EISA PC (male DTE)
210026	DB-25 DTE male	modems or multiplexer channels (female DCE)
210027	DB-25 DTE female	Male DCE devices (non-standard devices)
210038	DB-9 female	ISA PC serial port

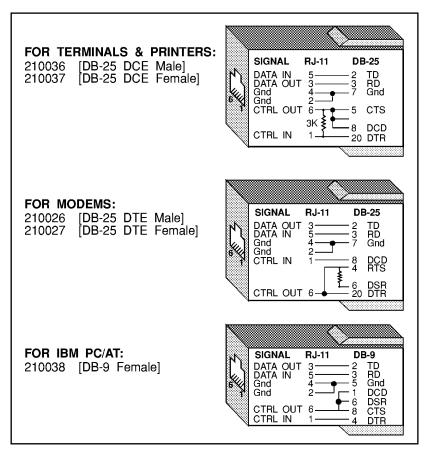


Figure 3-11. CS Modular adaptors

Note: When making modular adaptors, the 3K resistor shown in Figure 3-10 may be eliminated for use with most terminals. The resistor is used to loop control signals back to the attached device when 4-wire cable is used and pin 6 is not connected. When using 6-wire cable and there is a voltage on pin 6, the resistor has no effect and the voltage on pin 6 is passed through to the attached device.

FM Modular Adaptors

FM modular adaptors (see Figures 3-12) convert 10-pin RJ-45 modular jacks to DB-25 or DB-9 (RS-232) connectors. Some software applications require the use of the Data Set Ready (DSR) signal. For applications requiring DSR, use one of the following modular adaptors or it's equivalent.

Part No.	Connector	<u>Connect To</u>
210068	DB-25 DTE male	modems or multiplexer channels (female DCE)
210069	DB-25 DTE female	Male DCE devices (non-standard devices)
210070	DB-25 DCE male	terminals or ports (female DTE)
210071	DB-25 DCE female	terminals, ports, personal computers (male DTE)
210072	DB-9 female	personal computer serial port

Note: If the application does not require DSR, an 8-wire RJ-45 cable may be used.

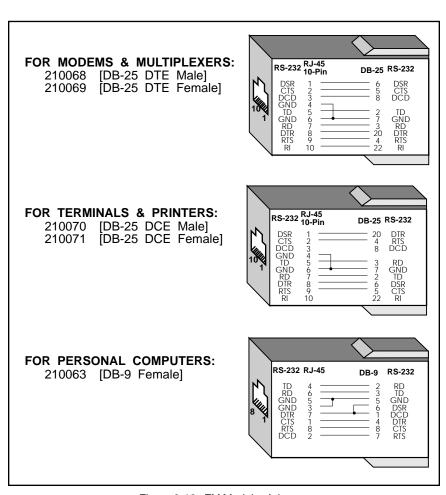


Figure 3-12. FM Modular Adaptors

Punch Blocks

Punch blocks provide a quick and inexpensive solution to wiring around buildings. They may be concealed in wiring closets and individual wires run to each location where a terminal or port is to be connected. Punch blocks may be used with modular wall outlets and wiring accessories.

Figure 3-13 illustrates connecting the MEGAPORT board to punch blocks using modular adaptors and modular wall outlets. Wall outlets should be wired as shown in Figure 3-14. Figure 3-15 shows the pinouts for the Equinox part number 210044 punch block when connected to a MEGAPORT CS board.

Note that the punch block has two 50-pin PBX connectors and connects 24 ports. Also note that internally the punch block has common ground wired to the center two rows of pins. Any of these pins may be used for connecting terminal ground to the port.

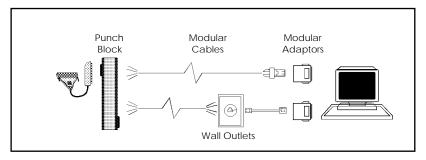


Figure 3-13. Punch block installations

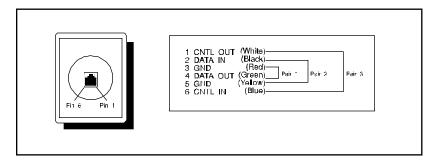


Figure 3-14. Modular wall outlet wiring: CS ports

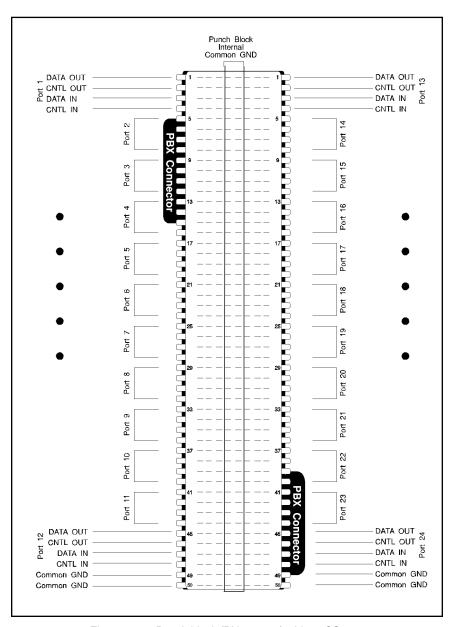


Figure 3-15. Punch block (PN 210044) wiring: CS ports

CS Port Full Modem Control Wiring

As discussed above, MEGAPORT CS ports regularly provide two modem control signals per port (i.e. CNTL OUT and CNTL IN), which may be used for either modem supervision (DTR/DCD) or hardware flow control (RTS/CTS), under software control.

The combination of various software flags and some special signal rerouting (the "borrowing" of two control signals from a neighboring "donor" port) provides the additional two signals. Up to one half of the CS ports on a board can thus be used for devices requiring full modem control, leaving the remaining ports available for use with terminals and printers.

Figure 3-16 shows the wiring needed to connect a donor port's control signals to a full modem control recipient port. Equinox offers several full modem control wiring accessories which provide both sets of signals. They are outlined below.

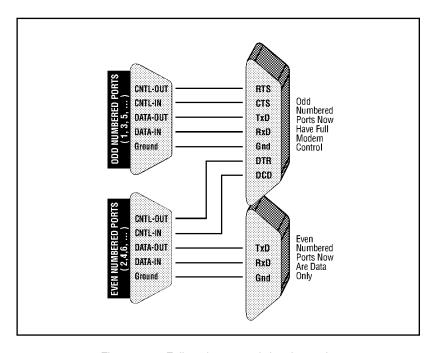


Figure 3-16. Full modem control signal rerouting

Modular Full Modem Control Adaptor

To implement full modem control in a modular environment, Equinox provides modular full modem control adaptors. These devices consist of two short cables which are plugged into the appropriate adjacent port jacks on an Equinox modular splitter. At the end of the cables is a small housing with two jacks, one providing full modem control and the other data only (see Figure 3-17). Refer to the *Equinox Ordering Guide* for available adaptors and their part numbers.

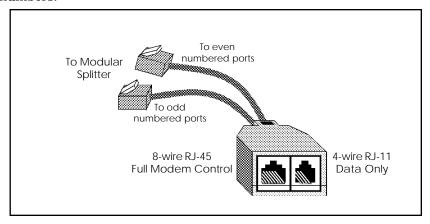


Figure 3-17. Modular full modem control adaptor (PN 690242)

Special Considerations

When connecting devices to the MEGAPORT board ports, it is important to understand the difference between DCE and DTE devices. This is to ensure that data flows in the right direction. If DCE and DTE are not wired correctly, communications between the two devices may be blocked.

- DCE Data Communications Equipment such as modems.
- DTE Data Terminal Equipment such as terminals and printers.

It is also important to understand the difference in terminology between DB-25 and modular wired installations.

Wiring Conventions

In general, with conventional wiring, DTE devices can only be connected to DCE devices. This ensures, for example, that the output of the terminal is routed to the input of the modem. For example, computer terminals (DTE devices) should be connected to DCE ports, such as the 990117 DB-25 distribution panel and the 210036 modular adaptor.

This is performed (1) in DB-25 environments with conventional, straight through cables, and, (2) in the modular environment with single reversing modular cables and one modular adaptor.

Non-Conventional Wiring

In some situations, it may be necessary to do a non-conventional interconnection. It is possible to connect DTE devices to other DTE devices and DCE devices to other DCE devices. For example, if two terminals or ports must be placed back-to-back without intervening modems.

This is done in DB-25 environments with null modem cables.

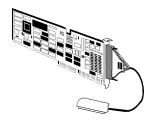
CHAPTER 4 CONNECTING DEVICES TO LD PORTS

This chapter applies equally to MEGAPORT, MEGAPORT/2 and MEGAPORT/RS and explains the cabling options which may be used to connect devices to:

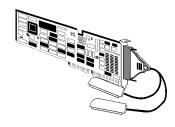
- the MEGAPORT 12LD board.
- the MEGAPORT 24LD board.
- the first group of twelve ports (i.e. ports numbered 1 through 12) on the MEGAPORT 12LD+12CS board. (The first group of twelve ports on the MEGAPORT 12LD+12CS board are identical to the corresponding ports on the 12LD and 24LD boards.)

These ports are all of the LD type and can be used at high speed with standard RS-232, RS-422 and RS-423 devices for long distance cable runs without any special devices at the terminal end. In addition, LD ports have built in surge suppression for protecting the port from damage due to voltage transients.

NOTE: The information in this chapter should not be used to connect devices to MEGAPORT 12CS, MEGAPORT 24CS boards or to connect devices to the second group of twelve ports on the MEGAPORT 12LD+12CS boards. For information on connecting to these ports please refer to Chapter 3, *Connecting to CS Ports*.



12LD



24LD (or 12LD+12CS)

To assist in the wiring of the MEGAPORT board, Equinox sells a complete set of cabling accessories. See an *Equinox Ordering Guide* for more information.

As shown in Figure 4-1, standard RS-232 devices may be connected to LD ports and operate reliably at 38.4 Kbps over standard two-twisted-pair cable at distances up to 1000 feet without requiring a line driver on the terminal end.

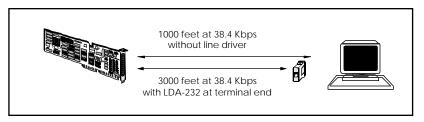


Figure 4-1. LD Port application.

If an Equinox LDA-232 terminal powered line driver is used at the terminal end the distance is increased to 3000 feet. The LDA-232 also provides surge suppression on the terminal end.

Even greater distances can be achieved at lower bit rates. At 19.2 Kbps both distances double and at 9600 bps they double again. However, special care must be taken in connecting devices to LD ports to obtain these distances.

Complete details about LD ports may be found in *Equinox Technical Note #1, Equinox part number 302024*, a copy of which is enclosed with all MEGAPORT LD boards.

LD Port Signals

Signal Names

The names of signals on the telco connectors of the MEGAPORT ports indicate the direction of the signals. They are either *inbound* (received by MEGAPORT) or *outbound* (transmitted from MEGAPORT).

Data Signals

Each LD port uses two twisted-pairs. Data is transmitted from the port on one pair and received on the other.

DATA IN(+) and DATA IN(-) indicates data received by the MEGAPORT board from the attached device (inbound). DATA IN(-) is normally connected to TxD (Transmit Data) for terminals and printers. DATA IN(+) is connected to ground on the terminal or printer.

DATA OUT(+) and DATA OUT(-) indicates data transmitted by the MEGAPORT board to the attached device (outbound). DATA OUT(-) is normally connected to RxD (Receive Data) for terminals and printers. DATA OUT(+) is connected to ground on the terminal or printer.

EIA Control Signals

No EIA modem control signals are provided on LD ports.

Conversion to RS-232 Signal Names

The conversion to RS-232 from the LD telco connector pinouts and MEGAPORT signal names, DATA IN(+), DATA IN(-), DATA OUT(+) AND DATA OUT(-), is accomplished with one of the Equinox cabling accessories. These accessories and wiring techniques are discussed in Chapter 3 under the heading *Wiring to Terminal Devices*.

Telco Connector Pinouts

The following paragraphs list the cable pinouts of the LD ports. The physical ports are mapped by the device driver into the appropriate device names.

MEGAPORT 12LD Board Telco Connector Pinouts

Figure 4-2 shows the wiring of the telco connector on the MEGAPORT 12LD board. A single cable provides all the signals required for supporting 12 ports.

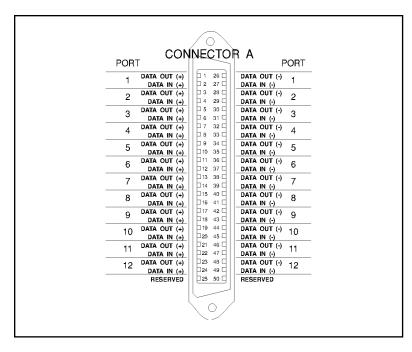


Figure 4-2. MEGAPORT 12LD telco connector pinouts.

MEGAPORT 24LD Board Telco Connector Pinouts

The wiring of the telco connectors on MEGAPORT 24LD board is shown in Figure 4-3. Connector A provides LD ports 1-12 and is identical to the MEGAPORT 12LD connector. Connector B provides LD ports 13-24.

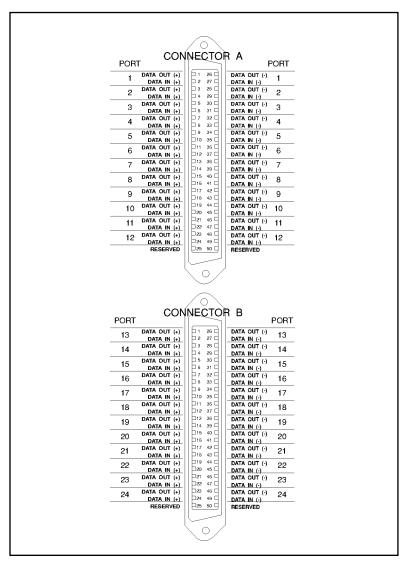


Figure 4-3. MEGAPORT 24LD telco connector pinouts.

MEGAPORT 12LD+12CS Board Telco Connector Pinouts

The wiring of the telco connectors on the MEGAPORT 12LD+12CS board is shown in Figure 4-4. Connector A provides LD ports 1-12 and is identical to the MEGAPORT 12LD connector. Connector B provides CS ports 13-24 and is identical to the Connector B of the MEGAPORT 24CS connector (see Chapter 3).

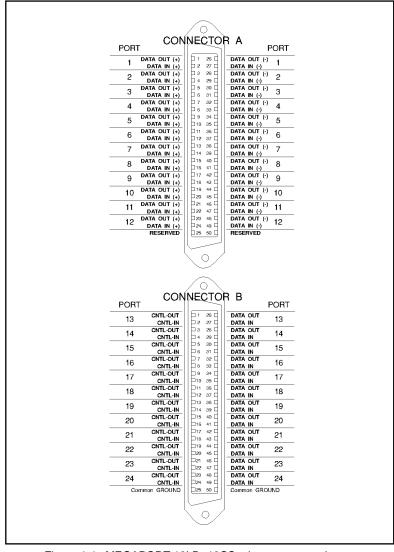


Figure 4-4. MEGAPORT 12LD+12CS telco connector pinouts.

Wiring to Terminal Devices

Complete details about LD ports may be found in Equinox Technical Note #1, *MEGAPORT LD: Exploring Long Distance Connections to Terminals and Printers, Equinox part number 302024*, a copy of which is enclosed with all MEGAPORT LD boards. This publication also addresses various other features of the LD products line.

LD Cabling Issues

The long distance capability of the LD interface is due to the high noise rejection provided by twisted pair cable and the bipolar data signals used by the LD interface. This interface requires the following rules be obeyed in cabling LD ports to devices.

- It is extremely important that twisted-pair wiring be used for connecting devices to the ports. To realize the maximum distance at the highest speed, minimize or avoid the use of modular flat telephone cable (which does not provide twisted-pairs).
- 2. The two input signals: DATA IN(+) and DATA IN(-) must reside in the same twisted pair. Also, the two output signals: DATA OUT(+) and DATA OUT(-) must share their own twisted pair.

LD Cabling Schemes

There are two recommended cabling schemes for connecting devices to MEGAPORT LD ports. Both methods are illustrated in Figure 4-5.

The first scheme uses 25 pair telco extension cables for the long distance portion of the cable run and then uses the Equinox 210117 LD modular splitter to connect a group of ports in close proximity to each other to the MEGAPORT.

The second scheme uses a telephone punch block to interface the MEGAPORT with the individual two-twisted-pair cables that are run to modular wall outlets.

Both schemes have their advantages and disadvantages. The Equinox pinouts match standard telephone cabling practices. Thus, when planning an installation in a new building, a telephone installer can connect wall outlets to punch block and the MEGAPORT round cable telco connector can be connected to the punch block directly, with no special consideration on the part of the installer to its use for data instead of voice. Alternatively, the modular splitter is useful when a number of devices located some distance (i.e. in another building) are required to be connected to the MEGAPORT.

CAUTION

Cabling Between Buildings

When connecting devices to LD ports located in another building, the potential for lightning induced surges is highly likely, especially if the wiring is unprotected. This is usually caused by a shift in the ground potential between the two buildings. The LD ports are protected due to their on-board surge suppression. However, the surge can be transmitted to the device connected to the LD port, with a high probability of damage occurring.

To protect terminals and other devices connected to LD ports, Equinox strongly recommends the use of the Equinox LDA-232 on the terminal side. The surge suppression on the LDA-232 should protect the terminal equipment in this case, although in severe cases the LDA-232 may be sacrificed in place of the terminal equipment.

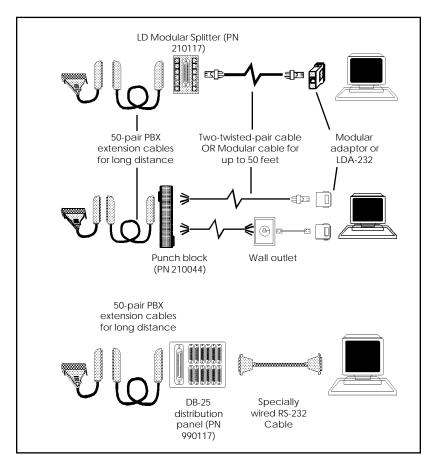
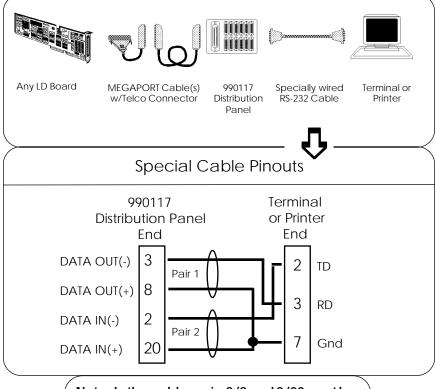


Figure 4-5. MEGAPORT LD cabling methods.

DB-25 Wiring

Although not highly recommended by Equinox, it is possible to use DB-25 type connectors with LD ports. This is especially useful where existing wiring is to be used.

Figure 4-6 shows the cable connections for the distribution panel between a MEGAPORT board and a terminal or printer. The cable(s), provided with the LD board, must be used between the DB-25 distribution panel (part number 990117) and the MEGAPORT board. The specially wired cable to the terminal or printer is not provided by Equinox. However, all necessary RS-232 wiring information is detailed below under *Special Cable Pinouts*.



Note: In the cable, pairs 3/8 and 2/20 must be twisted pairs. A 4-wire cable is required. Connection of DATA OUT(+) and DATA IN(+) must be done only at terminal or printer end.

Figure 4-6. MEGAPORT LD DB-25 wiring.

Modular Wiring

LD Modular Splitter

Modular splitters are used with modular adaptors and modular cable. Modular splitters convert the 50-pin telco connector to a set of 12 modular jacks. Figure 4-7 illustrates devices connected to the MEGAPORT board using the modular splitter.

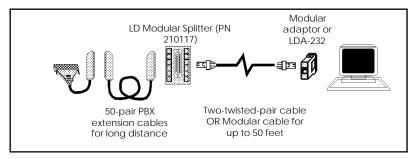


Figure 4-7. LD modular splitter.

- The LD modular splitter (Equinox part number 210117) converts the signals on the 50-pin connector to 12 RJ-11 modular jacks. This splitter must be used to connect to LD ports. A CS version of the modular splitter (Equinox part number 210016) is available for connecting devices to CS ports. Two modular splitters are required to connect 24 devices to one MEGAPORT board. The modular splitter is wired as shown in Figure 4-8.
- Only 4 wires are used, so either 4- or 6-wire modular cable may be used to attach devices to the splitter. When user supplied modular cable is used, make sure the cable is reversing. Standard telephone cords are made this way and can be used for this application.
- Modular adaptors convert modular plugs at the end of modular cables to DB-25 RS-232 connectors. One adaptor is required for each device to be connected. The adaptors for MEGAPORT LD boards are the same as for CS boards.

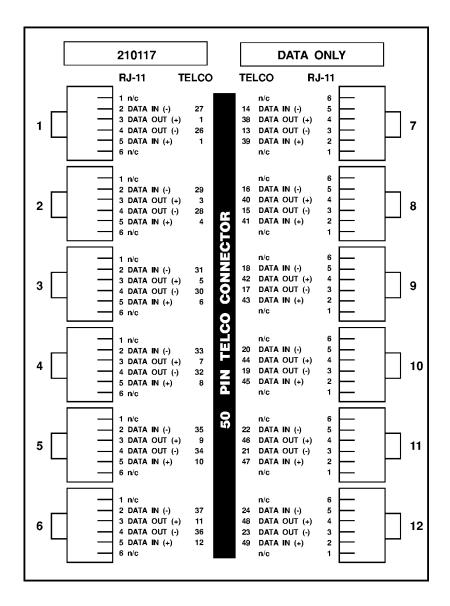


Figure 4-8. LD modular splitter wiring.

Modular Cables

RJ-11 modular cable is the flat cable used for wiring telephones inside of buildings. The cable is terminated at each end with an RJ-11 modular plug (connector) which is inserted into the modular jack of an appropriate wiring module. Standard modular cables available from Equinox or wiring distributors are reversing; that is the pins are reversed on each end (so that pin 1 on one end is connected to pin 6 on the opposite end, etc.). Figure 4-9 illustrates the signals passed through modular cables when connected to a LD port using the Equinox part number 210117 LD modular splitter.

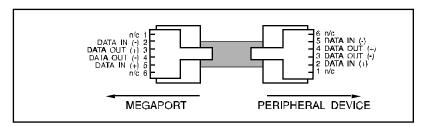


Figure 4-9. LD Modular cable signals.

Modular Adaptors

Modular adaptors convert modular jacks to DB-25 (RS-232) connectors. The following list describes the modular adaptors available from Equinox. This list may be used to determine the correct modular wiring required for system installation

Part No.	Connector	Connect To
210036	DB-25 DCE male	terminals or ports (female DTE)
210037	DB-25 DCE female	terminals, ports, IBM PC, XT, PS/2 (male DTE)
210026	DB-25 DTE male	modems or multiplexer channels (female DCE)
210027	DB-25 DTE female	Male DCE devices (non-standard devices)
210038	DB-9 female	IBM PC AT serial port

Note: Although modems can be connected to LD boards, it is not recommended because LD boards do not support control signals.

Modular adaptor wiring is shown in Figure 4-10. When making modular adaptors, the 3K resistor shown may be eliminated for use with most terminals. The resistor is used to loop control signals back to the attached device when 4-wire cable is used and pin 6 is not connected. When using 6-wire cable and there is voltage on pin 6 the resistor has no effect and the voltage on pin 6 is passed through to the attached device.

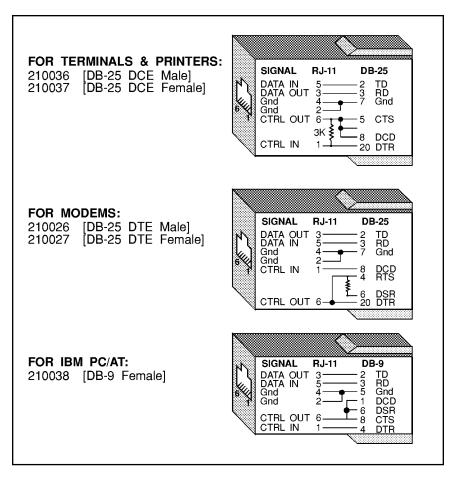


Figure 4-10. Modular adaptors

Punch Blocks

Punch blocks provide a quick and inexpensive solution to wiring around buildings. They may be concealed in wiring closets and individual wires run to each location where a terminal or port is to be connected. Punch blocks may be used with modular wall outlets and wiring accessories.

Figure 4-11 illustrates connecting the MEGAPORT board to punch blocks using modular adaptors and modular wall outlets. Wall outlets should be wired as shown in Figure 4-12 below. Figure 4-13 shows the pinouts for the Equinox part number 210044 punch block when connected to a MEGAPORT LD board.

Note that the punch block has two 50-pin PBX connectors and connects 24 ports. Also note that internally the punch block has common ground wired to the center two rows of pins. In LD applications these pins are not used.

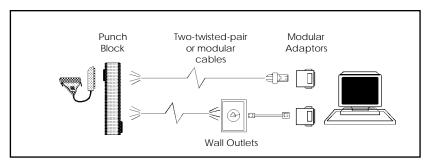


Figure 4-11. Punch block Installations.

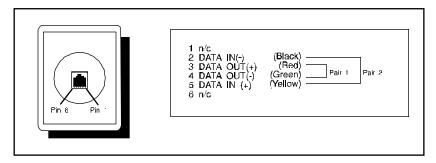


Figure 4-12. Modular wall outlet wiring: LD ports.

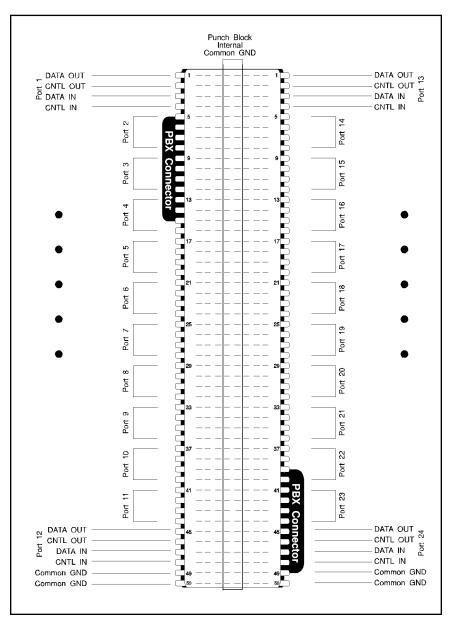


Figure 4-13. Punch block (PN 210044) wiring: LD ports.



At Equinox we are always striving to make our product manuals accurate and easy to use. If you have an improvement to suggest or find an error in this manual please let us know.

Manual:	MEGAPORT Hardware Reference Manual (560047/B)
Operating	System and Version:
Driver Ve	rsion:
Problem:	
Solution:	
What cou	ld be added or changed to make the manual better?
Name:	Title:
Company	Phone:
Send to:	Equinox Systems Inc.
	ATTN: Customer Service One Equinox Way
	Sunrise, FL 33351-6709

954-746-9000, Fax: 954-746-9101

APPENDIX B TECHNICAL SUPPORT PROCEDURES

Equinox makes every effort to ensure that your MEGAPORT board is of top quality in all respects. If you have a problem with your MEGAPORT board we ask you to follow these steps before you call:

- Read the appropriate hardware and software reference manuals and any release notes which describe the procedure you are trying to perform.
- Check the Equinox MEGAPORT Bulletin Board System. To access the board, simply call (954) 746-0282 with any speed modem and use N-8-1 or E-7-1 parameters. Just follow the prompts to answer a few identifying questions.
- Contact the distributor from whom you purchased the board. Equinox authorized distributors are fully trained on MEGAPORT and MEGAPLEX products and are authorized to handle technical support, service, returns and warranty claims.
- If you still need assistance after calling your distributor or other point of purchase, call Equinox Technical Support at (954) 746-9000. You can also fax problem reports, bugs, questions to us at (954) 746-9101. Please have the following information available when you call:

Board Type:

Serial Number:

Date of Purchase:

Place of Purchase:

Operating System:

Operating System Version:

Device Driver Version:

Computer Make & Model:

Other Boards in Machine:

Description of Problem:

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